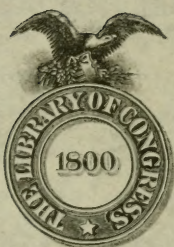


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MENTICULTURE

AND

AGRICULTURE:

OR,

WHAT OUR SCHOOLS SHOULD DO FOR AGRICULTURE.

By B. G. NORTHROP,

Secretary of the Connecticut Board of Education.

[FROM THE REPORT OF THE CONNECTICUT BOARD OF EDUCATION.]

NEW HAVEN:

TUTTLE, MOREHOUSE & TAYLOR, PRINTERS.

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WHAT OUR SCHOOLS SHOULD DO FOR AGRICULTURE.*

Farming is the leading and most essential business of the country, occupying more than three-fourths of our laboring population. It is the basis of the wealth, prosperity and power of the American people. Its depreciation would demoralize the nation. It was the original, divinely appointed calling of man. God planted a garden in Eden and made it man's first duty to "dress and keep it." When driven from Eden, it was still his mission to "till the ground from whence he was taken and to eat bread in the sweat of his face." The Creator plainly intended that Agriculture should be the groundwork of civilized society, the basis of all progress. On its prosperity hang the hopes of the race, far more than on any other calling. It must provide the means of sustaining an increasing population, or there can be no growth. Commerce and manufactures depend upon it more than it does upon them. In the words of Webster, "they all stand together like pillars in a cluster, the largest in the center, and that largest is Agriculture." For an interest so broad and vital to the prosperity of the whole country, our schools should accomplish the best possible results.

Now that slavery is abolished, we have no vestige of a caste system in America. Labor is honorable, and the laborer is honored. The most popular rallying cry to help a candidate for the highest office, is some term which affiliates him with farmers or other workmen, like "the rail-splitter" or "the tow-path boy." In contrast with the distinct classes and hereditary nobilities of the old world, it is our proud national characteristic, that we are a working people; that he is the noblest who works most and best for the general weal, and that the cause of the workman is recognized as the cause of all. The

* Given as the opening address before the State Agricultural Convention at New Britain, December 15, 1880.

best way to elevate farming is to elevate the farmer. The people are learning that mere muscle is weak, and that brains help the hands in all work; that knowledge and skill multiply the value and productive power of muscular efforts. Whatever the chemical analyses of our Experiment Station may show, the best of all fertilizers is brains. In farming as everywhere, if knowledge is power, ignorance is impotence. What a man *is*, stamps an impress upon what he does, on the farm or in the shop. The style of the work depends on the character of the workman. Whatever elevates the farmer ultimately improves his farming. Whatever degrades the farmer at once depreciates his work. The wealth and welfare of individuals and communities, always dependent on labor, can be most fully secured only by educated labor. You can dignify farming in no way so surely as by educating and thus elevating the farmer. As mind triumphs over matter, the amount of manual labor requisite to secure equal results constantly lessens. The future improvement of farming depends on brain as well as brawn. The progress of civilization has always been commensurate with man's dominion over nature and his utilization of her forces and resources. "Subdue the earth and have dominion over it," was the primeval command. We gain that dominion over nature just in proportion as we *discover* and obey her laws. In struggles for material success, he wins who best wields physical forces.

To enable our schools to accomplish better results for Agriculture, I invite our farmers to do more for the schools, and especially to visit them. We need a still higher appreciation of them and a more active and intelligent interest in their improvement. Apathy on the part of parents would neutralize the efforts of the best teachers. The character of the schools in every place must answer to the local public sentiment. You stimulate public interest by improving the schools no more surely than you improve the schools by elevating public opinion. The Legislature alone cannot create good schools. Right laws may accomplish much, but the people, once in earnest, will do more. In our rural districts no class can so effectually advance this great interest of the people as the farmers.

The most essential service our Public Schools can render for

Agriculture, is to give all our youth a thorough training in the common English branches. These lay the foundation for success in all after work, whether on the farm, in the shop, or store. The point of greatest weakness even in our colleges is found in the deficiency of their candidates in the elementary branches. Thoroughness here at the outset means thoroughness everywhere. The habits of accuracy, of application, of self-control, and self-reliance in overcoming difficulties early formed in school, constitute the best preparation for the farm and all other callings of life. Far more thought and time and drill should be given to these simple elements. Rightly taught, they provide the truest discipline for the juvenile mind and form the best basis for all future acquisitions. When we build the superstructure without a firm foundation, all is insecure. The first effort of the school is to lay the ground work broad and strong. That done, and you create the desire and the skill to build up the edifice; that done and school is a welcome place, and study becomes a pleasure; that done and there follows such a hungering for knowledge that when one's school days are ended, he realizes that his education is but just begun, and for the rest, it shall be the aim and pleasure of his life to educate himself. Even though the milking may summon him early in the morning and the chores detain him late at night, he will seek time and find time for the cherished work of self-improvement. Place him where you will, let his work press as it may, he will find leisure for reading, and occupy rainy days, the long winter evenings, and all intervals of labor in efforts for self-improvement. Even the odd moments thus utilized, in the end yield a large reward. The habit of utilizing these odd moments and thus learning how to economize time as well as money, has most important moral bearings. The boy who thus early learns that "life is real, life is earnest," and makes the most of each passing hour, is gaining self-command and self-respect, high aims and purposes that lift him above temptation and give him the true farmer's self-poise and conscious independence.

To secure the best results for our farmers, I would advocate giving greater prominence to *reading*, which I have long regarded as by far the most important study taught in our

schools. This is the surest way to the mastery of all higher studies. Early proficiency here, fosters a fondness for books, while aversion to study often springs from tasking youth in severer branches before they can read fluently. Let a child early learn to read with facility and, as I have aimed to show in another connection, he has the key by which he can open any door in the temple of science. Isolated as the farmer's homes necessarily are, to a great extent, reading should be made the never failing attraction of the long winter evenings. But when it is a toilsome process to spell out the words, there can be little pleasure in reading, or interest in the narrative. It is the duty or rather the privilege of the farmer to see to it that his children are liberally supplied with attractive and wholesome reading, whether by the purchase, or exchange of books, or by reading clubs, or by a town or district library. Whenever its importance is duly felt, some method of gaining the proper supply will be devised.

For the best results to our farmers and to all industrial classes, less time should be given to the complex puzzles of arithmetic and more to the simple ground rules. Master addition, subtraction, multiplication, division, per-centage, and the keeping of accounts and the rest which is of practical value is easily and quickly gained. Our arithmetics are too voluminous. Let there be more drill in rapid mental combinations and practical methods and principles and less study of abstruse processes. Such topics as alligation medial and alternate, and commutation of radix and others as intricate and useless, may well be omitted in a common school course. These and kindred topics never applied in ordinary business fill a large space in the arithmetics and waste much precious time of the pupils. They have the sanction of tradition rather than of common sense. In continuing them, teachers and authors have consulted usage more than utility. Like the titled scions of rank in the old world, they have come down by so long a literary descent, that no one disputes their right to their honored place. Worth more than all these obsolete processes, is the thorough mastery of the ground rules. Rapid mental combinations should be daily practiced till pupils can add, multiply and divide with the utmost rapidity and accuracy. The art of

arithmetic will thus be mastered though the profundities of the science be not explored. Ex-President Thomas Hill of Harvard College, himself an eminent mathematician, strongly condemns the common practice of stupefying and disgusting pupils with premature attempts to understand arithmetic as a science, while as a consequence they fail to acquire facility in it as an art. Life is not long enough to spend so much time on the intricacies of compound proportion, permutation and the like, that not one in a thousand ever applies in business.

The public school should train our youth in habits of observation, which is the prime secret of success in farming and forms the true basis of all higher education. The child's intellectual life begins with impressions from the senses, which are the windows of the soul. The noblest of these and the royal avenue to the mind is the eye. This sense-education, commences in the cradle and should continue through life. Hence "things before names, ideas before words," and in higher stages, "principles and processes before rules" should be the motto. Too often the teacher begins with books and continues with books only, teaching that which is impractical if not incomprehensible to the neglect of things nearest at hand, things most interesting, suggestive and useful. God designed nature to be the earliest and most constant teacher of the juvenile mind, and has made objects and events the leading instruments of developing its faculties. Invaluable as are books, they are but the art of man, while nature is the art of God. It is therefore a narrow view of education that makes books its only instruments. Every device should be employed to foster a love of nature and form habits of careful observation of common things. The organs of sense, when not early trained, become rigid and unimpressible. The teacher who relies upon the text-book alone is more than three thousand years behind Job, whose maxims deserve a place in the most modern didactics. "Ask now the beasts and they shall teach thee and the fowls of the air and they shall tell thee; or speak to the earth and it shall teach thee; and the fishes of the sea shall declare unto thee." Such a teacher forgets the motto of the wise man who said, "Go to the ant thou sluggard; consider her ways and be wise," or that of the Great Teacher who said,

"Consider the lilies of the field how they grow," and "Behold the fowls of the air." Milton well says: "To know those things which about us lie, in the daily life is the prime wisdom."

I commend to our farmers' boys the advice given to youth by Hugh Miller: "Learn to make a right use of your *eyes*, the commonest things are worth looking at, even stones, weeds and the most familiar animals. One of the best schools I ever attended was the miscellany of objects and circumstances surrounding me in my native district, challenging the first exercise of my senses and fancy, and this is a species of education open to all." True, but how few are open to it. How many go through the world practically blindfolded. Under the lead of his Uncle Sandy the keen-eyed harness-maker, Hugh Miller while a boy, had observed carefully the rocks, rains, tides, trees, ferns, shell-fish, sea-fowl and insects along the rocky shore of his native Cromarty. While working seventeen years as stone mason in the quarries or sheds, he studied the stones he was hammering and thus became the most eminent geologist of his age. So in general, the most distinguished men of all ages and countries have been close students of nature and observers of common things.

I have emphasized this subject because the careful observation of nature's processes is specially essential to the success of the farmer. Unless acquired early, the habit is not likely to be ever formed. This work cannot be done by proxy. The judgment of the farmer must be based on his personal observations. Indispensable as is the knowledge gained from books, its use and application depend on one's own study of things. The failures of fancy farmers come from following book theories without that adaptation to changed local conditions which personal observation and experience alone can suggest. Hence, both in the family and school, curiosity should be so stimulated as to prompt an insatiable desire for that knowledge which comes through the senses when trained in observing the qualities of common things. Curiosity, or what is kindred, love of knowledge, is one of the strongest natural desires of the child. Though too often dwarfed by our blundering, when the senses are sharpened, it is one of the most vital

forces in education, becoming the parent of perception and attention, of memory, imagination and expression. It prepares the soil and fertilizes the seeds of truth. A farmer might as well sow a field without plowing as a teacher instruct pupils in whose minds no love of knowledge has been awakened. Strong in childhood, it should grow with years and attainments. Though at first a restless instinct, it should mature into a ruling passion. Curiosity is to the mind what appetite is to the body. It creates a hungering for knowledge which is the mind's food. Love of truth was as strong a passion with Newton or Agassiz as love of conquest with Napoleon. Under its healthful inspiration, study is a pleasure—without it a task; the dullest drudgery, “a weariness of the flesh.” Curiosity is the primal desire to which the child's nature responds; it is the impelling power to which genius, when enriched with the treasures of science, is most susceptible. The amplest supplies only add fuel to the flame. Instead of surfeit, there comes an intenser craving for more. Each new attainment gives strength and stimulus for higher acquisitions.

To show how susceptible is the plastic mind of childhood when consciously brought into contact and sympathy with nature, by a teacher competent to be her interpreter, I mention two out of a multitude of similar illustrations. An eminent botanist narrated to me the following personal incident: “When I was a mere boy, my teacher handed me a flower, asking me to notice *all* its parts, and when I had done so for the first time in my life, he gave their several botanic names, introducing each with its Saxon synonym, which I never forgot. That brief talk of twenty minutes inspired me with an interest in observation and study that led to collegiate culture.” Said another gentleman, author of popular textbooks on Natural History, “My teacher once invited me to search on my father's farm for curious stones. I found a white stone with sharp edges, of which he said, that is a good specimen, though very common, for three-quarters of the earth's crust is made up of this stone. It is very useful. The grains and grasses get the sharpness and strength of their stalks from a minute portion of this stone which the rootlets dissolve and

send up for their growth. It is useful in the arts. You have it also in the wall and in common plaster. Glass is made of it, only a little stuff is mixed with it to make it work well, and the very best spectacle glasses are made of pure specimens of stone like this, showing me a pure quartz crystal, and pointing out its exact hexagonal form and pyramidal cap. That brief talk changed my history and fired my mind with love of learning."

The farmers' boys have the best opportunities of learning these practical lessons from nature, provided the teacher is competent to start him in the right lines of observation. On the farm, birds, insects, fishes and all animals, flowers and foliage, plants, shrubs, creeping vines and trees, to say nothing of the minerals under his feet, are all practical primary teachers.

In the interests of Agriculture and all industrial pursuits, our youth should be taught at school the necessity of labor, its vital relation to all human excellence and progress, the evils of indolence and the absurdity of the common aversion to manual labor. This popular distaste for industrial pursuits should be *early* counteracted and the silly and pernicious notions that labor is menial, and that the tools of the farm or of a trade are badges of servility should be refuted in our schools, and more should there be said and done to dignify labor and render industrial pursuits attractive and reputable. The Agricultural, Forestral and Industrial Schools, so numerous in Germany, Switzerland and other portions of Europe, have proved as efficient in dignifying labor as in increasing its efficiency and market value. Girls, as well as boys, are there early taught, both in the family and school, that to learn to be useful is alike their duty, privilege and interest.

Many of our youth are afflicted with an ambition for easier lives and more genteel employments, and with the infatuation that city clerkships are the most eligible positions, while farming and the trades are not "respectable." Let them learn that the intelligent farmers or mechanics have a better chance of securing wealth, health and influence, than the over-crowded city clerkships can afford. In any average farming community, let twenty young men form a stay-at-home association and employ their best skill in rural pursuits; and another twenty,

we will suppose of the same capacity and education, start in quest of city clerkships, and, at the end of twenty years, I am confident our stay-at-homes would, on the average, have better health, better characters, greater influence and more money than the twenty who turned their backs on the humble industries of the country.

Clerks are often paid less than skillful mechanics, and are less independent. In their precarious positions, they are liable to disappointments and humiliating struggles with the thousands of others "looking for a place." Every advertisement for a clerk brings a whole swarm of applicants. How pitiable the condition of this superabundance of book-keepers and ex-changers wasting their lives waiting for a place, while our farms and factories, railroads and trades, are clamoring for educated superintendents, foremen, engineers, skillful managers and "cunning workmen." The position of the educated and well-trained farmer or mechanic is far preferable to that of average city clerks. The latter may dress better, talk more glibly, bow more gracefully, not to say obsequiously, but they compare unfavorably with our best farmers and mechanics in manly independence, vigor of thought and strength of character.

Too many of our young men leave the homestead on adventures less safe and reliable than the arts of industry. A good trade is more honorable and remunerative than peddling maps, books, pictures, patent-rights and clothes-wringers, or in a city store to be cash or errand boy, store-sweeper, fire-kindler or even book-keeper. Without in any way disparaging the useful position of the clerk, our young men may properly be cautioned against further crowding this already plethoric profession. To the boys in the country I say, instead of aspiring to an uncertain and precarious clerkship, stick to the farm or learn a trade, and you will lay the broadest foundation for prosperity.

The value of work as an educator hitherto too little appreciated, needs to be taught in our schools. Children learn by doing. This principle underlies the whole Kindergarten system. Its prime motto is, "Do nothing for the child which he can be encouraged to do for himself." His planning, combining, constructing and designing, with simplest materials, foster

interest and skill in work. It would be a grand achievement if the Public Schools should lead our youth to realize that their education is essentially deficient until they have learned to work in some useful form of industry. Such was the theory and practice of the ancient Hebrews, carrying out the plan given them from heaven. That is plainly the Divine plan for the race. The Hebrews held that all children should be taught some handicraft as an essential part of education. Among them labor was always honorable. No man was ashamed of his trade. No matter what his rank, every one must be trained to work. The chief of the Apostles did not degrade his high office by occasionally resuming his trade of tent-maker. By his own example, he enforced his precept, "if any would not work, neither should he eat," and sharpened his censure of "the disorderly busy-bodies working not at all." His associates never suspected that their old business of fishermen was disreputable. Why was it that the Great Teacher, when all possibilities were open to his choice, sought out the humble home of the carpenter and worked patiently at His reputed father's trade, except that He might condemn before the world the unchristian and heathenish notion that labor is menial. On the other hand, the Chinese Mandarins who let their nails grow as long as their fingers, to show that they never work, are the illustrious predecessors of the pretentious snobs who affect to despise the industrial arts.

The Jews still maintain their ancestral pride and faith in *work*. Notwithstanding long ages of bitter persecution, they are, as a race, most remarkable for perseverance, energy and ability. These manly traits have been fostered by their hereditary habits of industry. Debarred by oppressive laws for many centuries from the ownership of land, and from the ordinary industrial pursuits, they were driven to trade, which naturally continues to be their leading occupation, and in which they have gained marked success by dint of indomitable energy in the face of opposition and manifold difficulties. In his own life as well as in Endymion, Beaconsfield has strongly illustrated the power of an indomitable will. In every country, where the civil disabilities which oppressed them for so many centuries have been removed, the Jews have soon risen to be

leaders in education, in the press, in finance, in science and literature. Their wonderful ability and success seem to be the secret of the new and strange outburst of medieval intolerance and hostility which now disgraces Germany. The real trouble is, that the Jews so often outstrip their rivals and win the prizes which are open to fair competition. Complaints made in late German periodicals fully betray this unworthy motive. The outcry is, "The Jews are monopolizing the best positions in the Universities, absorbing millions of money, controlling exchange, becoming our leading capitalists and even crowding into Parliament, and in danger of moulding the destinies of the nation."

It is a redeeming feature of this outburst of narrowness that the Crown Prince, who himself once thoroughly learned a trade, denounces the present persecution of the Jews as "a shame to Germany." No man in Germany has done more than he to make labor reputable. He has practiced as well as preached the gospel of work, having early learned the cabinet-maker's trade. At Babelsberg, near Potsdam, the summer palace of the Emperor of Germany, are shown choicest articles of furniture made by him. When his only sister, the Grand Duchess of Baden, placed her daughter in the *schloss*, a famous school in Carlsruhe, she directed that she should be excused from none of the household industries required of the other pupils, that she should be trained in sewing and knitting, and made as thorough a seamstress as if she were expecting to earn her livelihood by her needle. Such royal examples of honoring industry have exerted a vast influence throughout the German Empire.

The tendency on the farm has been to overwork the boys and allow too little respite for play, for, with the young of all animals, play is the dictate of nature. The earth, the air and sea are full of animals who seem to luxuriate in playful activity. But, while all work and no play represses the jubilant impulses of childhood, the tendency of our times to all play and no work is far more harmful. Excessive amusements dissipate the mind, weaken the will and demoralize the whole character—making one restless, selfish, discontented and dependent. The habitual idler naturally degenerates into something worse, for

idleness and vice are twins. Labor, though called the curse and consequence of sin, may be a blessing to beings constituted as we are. We need the spur of necessity to energize our minds. Our richest thoughts and experience, and our best discipline, come to us when we are intensely active. Toils and privations even, give strength, endurance and courage for future achievements. The successful merchant who, with a fortune, retires from business, and sits down to enjoy himself with nothing to do but take his comfort, becomes the victim of ennui, if not of dyspepsia. Industry is essential to thrift and virtue, to mental, moral and physical health. The devil tempts every body, but the idler tempts the devil, who gives plenty of work to all whom he can find with nothing to do. The historian Froude well says, "There are but three ways of living; by working, by begging, or by stealing; those who do not work, disguise it in whatever pretty language we please, are doing one of the other two." Every man should have one vocation, and as many avocations as he can. Men of mark are men of work. The most industrious individuals and races are the most intelligent and powerful; the most elevated morally as well as mentally. In whatever land man can subsist in indolence, he droops in intellect, and there is the greatest demoralization in those tropical climates where leisure rather than labor is the rule of life. Man rises in the scale where his necessities compel constant industry, as he sinks where his wants exact no labor. Where industry becomes habitual and skillful, it not only supplies mere necessities, but stimulates demands above absolute wants. Every pure enjoyment gained by labor, prompts the desire for other and higher gratifications. Theodore Parker said, "The fine arts do not interest me so much as the coarse arts, which feed, clothe, house, and comfort a people. I should rather be a great man as Franklin, than a Michael Angelo; nay, if I had a son, I should rather see him a mechanic who organized use, like the late George Stephenson, in England, than a great painter like Rubens, who only copied beauty." Edward Forbes says, "He who knows not what it is to labor, knows not what it is to enjoy."

I once began a census of the eminent men of Connecticut, those who have been most successful in business, or in the

various professions, and found that the great majority of them had the discipline of rural occupations in their youth. The successive governors of our State, for a long time, with a single exception, were early accustomed to manual labor. The town of Lebanon has raised up five governors. Many retired rural districts and hill towns have been fertile in the richest treasures of intellect. The Litchfield County Jubilee showed a proud array of her sons among the most distinguished men of our country. On the other hand, those who despised labor in their youth have not been the benefactors of the community nor of themselves. "The artificers and inventors of the world, the men who revolutionize human industry and manifold the wealth and power of nations by new machines and new processes of art—the Watts, the Arkwrights, the Bramahs, the Clements, the Nasmyths, the Stephensons, the Fairbairns, the Fultons, the Ericsons, the Goodyears, the Howes, the McCormicks, have usually had their training on the farm or in the shops."

A striking illustration of the value of work as an educator has been recently furnished by Rev. Washington Gladden, of Springfield. He sent a circular to one hundred of the most prominent men of that place, asking, "Was your home during the first fifteen years of your life on the farm or in the city, and were you then accustomed to work when not in school?" Of the eighty-eight who replied, five only "had nothing particular to do," while ninety-four per cent. were farmers' sons, or hard working boys. So everywhere, as he clearly shows, the prizes of life are carried off by the men who learned to work. Men energized by such discipline are sure to outstrip those who were dandled in the lap of affluence and enervated by excessive indulgence. The farmer's boy learns patience and persistence by doing tough tasks without flinching. Mr. Gladden's conclusion from his inquiry was, that the boy early trained to work has eighteen chances of succeeding in life to one chance for the boy without this discipline.

Farm work, by the great variety of its forms and conditions, is peculiarly fitted to task and test the mind of a boy in planning, contriving and adapting means to ends under constantly varying circumstances. The necessities of the farm teach the

needful lesson that "where there is a will there is a way." Coleridge said, "A perfectly educated character is little else than a perfectly disciplined will." The *will* is by no means the only faculty to be educated, but its right culture involves that of every other faculty of the mind and heart. It is the will that differentiates men. This is the regal power of the mind, and more than any thing in our intellectual nature constitutes the man. A disciplined will equips the mind for action. An earnest will is the agent of every great achievement. There is nothing like it to make the mind resolute and successful, loyal to duty, superior to doubt, disdainful of ease, delighting in achievement, and rendering toil, self-denial, exertions in whatever form, easy and pleasant. A resolute mind will scorn sloth, love labor, spare no effort, neglect no opportunity to accomplish its end.

Labor develops inventive talent. The exigences of the farmer, remote from villages and shops, compel him to be something of a carpenter, joiner, blacksmith and harness-maker—a man of all work—"handy at anything." His business varies with the seasons and sometimes changes every day. A farmer's boy myself, early trained in practical industry and familiar with farm work, I have ever valued highly those practical lessons learned among the rough hills of grand old Litchfield County.

I counsel even the sons of affluence to spend at least one season at hard work on the farm or in the shop. The practical business drill there gained, the knowledge of nature and domestic animals, will amply compensate for the consequent loss in book learning, to say nothing of the health and physical training thus secured. With all our improved gymnastics, none is better than manual labor, when it is cheerfully and intelligently performed, and especially farm work. The habits of industry, once formed on the farm, or in the shop, may shape all the future, teaching one to value time, to husband the odd moments, and to practice diligence in business.

The pupils who luxuriate in the wealthiest homes of the city would profit by one year in the country with its peculiar work and play, its freer sports and wider range for rambles by the springs and brooks, the rivers and waterfalls, the ponds and

lakes, over the hills and planes, through the groves and forests; in observing nature, searching for wild flowers and curious stones, learning to recognize the different trees by any one of their distinctive marks, viz., the leaf, flower, fruit, form, bark and grain, watching the ant-hills, collecting butterflies and various insects, noticing the birds so as to distinguish them by their beaks or claws, their size, form, plumage, flight or song. Studying nature in any one or more of these varied forms, each so fitted to charm children, would refresh their minds as well as re-create their bodies.

The simple elements of the practical sciences should be taught in our schools, at least in oral lessons. A few talks on Agricultural Chemistry, will invite its fuller study when the school days are ended, especially in observing the chemical marvels that will meet one on every rod of his farm. The lectures given in our Teachers' Institutes on the geological characteristics of Connecticut, show how profitably our teachers might each give simple lessons on the prominent physical features of his town, county and State. Such talks will intensify the interest of the farmers' boys in the study of the stones and rocks which line their pathway. Specimens of our most common minerals ought to be in all our schools, procurable as they are by any competent teacher, without cost. No pupil should leave the Public School without knowing the names and leading characteristics of at least a dozen of our common minerals.

Familiar lessons should also be given about plants and animals, the laws of health and animal physiology. A few hints on "how plants grow," will add interest to the flora found in such great varieties on every farm. With specimens in hand, a few minutes devoted to pointing out the difference between inside growers and outside growers (saying nothing of endogens and exogens) or between parallel-veined and net-veined leaves, or the evergreens and those trees which drop their leaves annually, will awaken a lasting interest in the study of Botany. How early children may learn the difference between the animal, vegetable and mineral kingdoms, or that some animals have jointed back bones, that others have their bones outside of their bodies, while others have none at

all. Such glimpses of the beauties and wonders of science awaken a healthful desire to observe and study. I remember well the interest awakened at a Teachers' Institute in Massachusetts, when Prof. Agassiz gave a lecture on the grasshopper. Having by the aid of the boys collected several hundred grasshoppers and etherized them so that they would not jump about, he passed one to each of his auditors. This created general laughter and seemed ridiculous to many. But soon, instead of laughing at or looking at him, every one was looking intently at the object in hand. When he pointed out minute parts some one said, "Can't see them;" to which he replied, "Look again and learn to *look*, for I can see things ten times smaller than those to which I have called your attention. The power of the human eye is very great, and it is only the want of practice which sets such narrow limits to its powers. By learning how to examine *one* thing thoroughly, you learn how to see any thing. I present this subject to you, teachers, for the purpose of suggesting the desirableness and method of teaching Natural History in schools, and of using that instruction as a means of developing the juvenile faculties and leading them to the knowledge of the Creator."

If you ask where can teachers be found competent to give such lessons, I invite you to visit our Normal School and observe how well its pupils are trained in the methods of teaching the elements of the practical sciences in our schools, and I ask the coöperation of the farmers in securing better qualified teachers for their children.

By leading children to plant flowers, shrubs and trees in the school grounds, as well as around the homestead, and by brief lessons on rural art, and especially on the beauty, variety and value of trees, such an interest in their study and culture might be awakened as to make our youth practical arborists. Very little time would be required for those talks which would be sure to inspire an interest in arboriculture and in the broader subject of rural art and adornment. In this way our Public Schools may prove a partial substitute for the schools of Forestry in Germany and other European countries, which have exerted there a remarkable influence in diffusing a general interest in arboriculture among the people. They regard for-

ests as their friends, and understand their climatic influence and economic value in staying spring torrents, preventing summer droughts as well as in supplying lumber and fuel. The Germans have a passion for nature, and love to frequent their beautiful groves and gardens, for parks and woods abound in and near their cities and towns. The rural and suburban adornment, now the pride and glory of so many beautiful towns in Germany, and the fruit of this revived love of arboriculture, is largely due to the influence and literature which have emanated from her schools of Forestry. Hence a deep and general interest has been awakened in trees and forests and the wanton forest fires so common and destructive in America are comparatively unknown in Germany. The forest incendiary would be regarded as a common enemy, like the poisoner of an aqueduct, recklessly destroying that which it is the interest of all to preserve. Like their Forest Schools, our Public Schools should create that healthful public sentiment which constitutes the best possible protection of the woods.

In connection with the Sheffield Scientific School, which by the act of the Legislature in 1863 became the College of Agriculture and the Mechanic Arts of Connecticut, the endowment of one or two additional professorships would inaugurate a Department of Forestry. This could be done the more economically here, where the existing cabinets, laboratories and philosophical apparatus might be utilized in forestal instruction. The endowment of such a department would prove a great benefaction to the State and to the country, opening new fields of investigation which would bear directly on the ultimate resources and permanent prosperity of the nation. The conclusions of foreign foresters, though confirmed by the broadest observations and experience in Europe, cannot all be wisely adopted in American Sylviculture. Differences in soil, climate and other conditions, may affect trees in regard to rapidity of growth, health, durability of timber, texture, elasticity and grain of the wood and many other qualities. These vital questions can be determined only by careful investigations carried on in each country.

The Lombardy poplar, for example, was planted extensively in New England many years ago. Brought to England from

the banks of the Po in 1758, the facility of its propagation from cuttings, its rapid growth, its tall columnar outline in contrast with the spreading oaks and elms, soon made it a favorite in England, hence with the fathers of New England. Sending out its almost upright branches all along its tall stem, it was much admired here, as it is still by the Italians and was of old by the Romans, who called it the *arbor populi*. But in New England so many of its branches winter-killed that it soon became an unsightly collection of dead limbs, and it is now seldom seen. This is one of many illustrations of the necessity of adaptation to soil and climate, and of the fact that some trees which thrive in one locality will fail in another.

More than those of other workmen, the farmer's business binds him to his *home*. He lives on or near the soil he tills. Hence the farmer's home must often be somewhat isolated. To promote sociality and content, Col. Waring proposes that farmers should concentrate in villages, and for this purpose submit to the necessity of long daily journeys to their farms. This is unfortunately the European usage. There the cottages of the peasants are often crowded together more closely than are the homes in any well laid-out city, leaving scant room for out-buildings, to say nothing of gardens. This custom grew out of the necessities of a barbarous age as a protection from robbers, or out of that feudal system under which the serfs were crowded into huts under the castle walls of their lord or chief.

The very isolation of the American farmer is one source of his conscious individuality, independence and strength, when he is thus led to greater care and taste in adorning his home and grounds and increasing the attractions of the fireside. It has long been my ambition to improve the homes and home-life of our farmers, and of all our industrial classes, and help them realize that the highest privilege and central duty of life is the creation of happy homes. The chief aim of the industries of life, whether agricultural, manufacturing or commercial, and the great end for which government itself is worthy to be maintained, is that men may live in happy homes. "The hope of America is the homes of America," and the hope of Connecticut is the homes of Connecticut. You improve the schools by improving the homes as truly as you improve the

homes by improving the schools. Modern civilization relates especially to the homes and social life of the people, to their health, comfort, thrift, their intellectual and moral advancement. In earlier times and other lands, men were counted in the aggregate. They were valued as they helped to swell the revenues or retinues of kings and nobles. The government was the unit, and each individual only added one to the roll of serfs or soldiers. With us the individual is the unit, and the government is of the people and for the people and by the people. America may be brought to be the paradise of the laborer in the neatness, comforts, amenities and attractions of his home. In no other way can the best interests of this nation be more surely promoted than by the elevation and ennobling of its home life, and no agency can contribute to this grand achievement so universally and effectually as our public schools.

[Since the foregoing was in type, I have received a paper from M. H. Buckhan, President of the University of Vermont, on the question, "What kind of an education shall we give those of our children who are going to be farmers," which is so sound, practical and suggestive as to well merit re-printing entire in this connection. My limits will permit only the following condensed summary of its leading thoughts.]

I shall ask and answer the question as though it was a personal concern of my own: "What sort of an education shall I give to a child of mine who is going to be a farmer?" So you will get my best and sincerest thoughts on the subject. I will suppose that I have a boy who is going to be a farmer, calling him George, which is a good farmer's name, inasmuch as the word itself means farmer. The question then is, how shall I educate George? Now, although I should very much like to have one of my boys become a farmer, because I believe that a farmer's life may be as honorable, happy and useful as any life, I have no means of knowing that George will actually be a farmer. I have no right arbitrarily to choose my boys' occupations for them any more than I have to choose their wives for them. The system of caste which requires that every boy should follow his father's occupation, is tyrannous and cruel. But in this free age and land, one of the best opportunities a young man has is the opportunity of freely choosing his own calling among all those open to honorable ambition. A good

deal is said against academies and colleges on the ground that they "educate young men away from the farm." I know a man who says: "I want my boy to be a farmer. If I send him off to school, he will get weaned from the farm and go into some profession. I will give him just a good common school education; that is all that a farmer needs. Then he will stay at home and be a farmer." But one of the rights which God gave that boy was the right to make the most of himself in any sphere of life which he might freely choose. And yet the father, who ought to be his best helper, robs him of that right, and says, virtually, "I will fix it so that he will never have a chance to choose any calling and will never know that the chance was taken away from him." Why, if all farmers' sons were to become farmers, what would become of the professions, and of the world? Go through all the callings of life and pick out the most capable men in them, the greatest lawyers, statesmen, preachers, physicians, teachers, inventors, the men who are doing the greatest service to mankind, and you will find that the great majority of them came from the farm. Young men are constantly going from the farm to carry fresh vigor into other vocations, and others are constantly coming back from the professions to renew their exhausted vitality by restoring their connection with old mother earth. It is a strange thing to say, but I really think it needs to be said to the fathers—though perhaps not to the mothers: "Don't be jealous of your boys: don't grudge them a chance to rise; give them an opportunity to be something besides farmers if they want to be."

But George says he wants to be a farmer—just as Willie has decided to be a lawyer, Tom a physician, and Jack a locomotive engineer. George is only a boy. His notion of being a farmer is only a little boy's fancy. He may change his mind many times before he becomes a man. The smallest possible reason for fixing a man's career is a boy's whim—and any preference of a boy of ten or twelve can be little more than a whim. But cannot a wise parent or teacher discover a boy's talents and aptitudes and so reveal to him the career for which he is fitted and persuade him to follow it? I answer, only in the case of some very remarkable boy who, like Pascal or Mozart, early shows the unmistakable call of Providence in very marked talents. The ordinary boy's capacities do not appear until education has brought them out, and often not even then, not until practical life has tested them. George may be a farmer, but he may not be. For the present, then, it is very plain that I must not educate him as though I knew he was going to be a farmer, except so far as that education would be equally good for any other calling. But fortunately the groundwork and rudiments of all education are the same. I will, then, give him a

good elementary education. Now that means a good deal. Very few boys get a good elementary education.

Shall I send my boy to the public schools, where I cannot have my way about his studies, or shall I if I am able, put him in a private school where I can, to some extent, prescribe the course he shall pursue? I will put George into the public schools on account of the healthful stimulus which publicity and free competition gives to the schools, but I will use my utmost influence to make them as good as they can be made. I will, so far as I am able, see to it that the buildings, the furniture, the apparatus, and above all the teachers are the best that my district, my village or town can be persuaded to provide. I will tax myself and do my utmost to persuade my neighbors to tax themselves enough to maintain the very best school we can afford.

But George's education does not depend on the school alone. It is very important that he should form the habit of reading good books. But I cannot afford to buy him all the books he will need; he must have access to a good library. I must therefore stir up my neighbors to start a village or town library. I will take good sterling newspapers, both religious and secular.

Now, if I have done my duty and he has done his, at fifteen years of age, the boy has got an education which is not to be despised. If he makes the most of it hereafter, extending his information by reading, using his opportunities to profit by intercourse with superior men, above all putting thought and plan into his business, and so being constantly educated by it, he may become a man of fair intelligence, competent to do the duties of a man in the humbler walks of life. If he have unusual native power of mind, he may do much more than this. Such a mind will often burst through the limits which beset half-trained minds of ordinary capacity and find or make itself a way to knowledge and power. These are the few cases which mislead the popular judgment. Because here and there one, rarely gifted, most rarely gifted with that indomitable perseverance which makes light of toils which would kill ordinary men, rises to eminence without the direct help of academies and colleges, it is inferred that ordinary men, of average talents, with moderate education, may do the same. But George is an ordinary boy. The question now is, shall he go on with his education? shall he go for some years to the high school or academy? The result of much thought on that question is, he shall go, if I can afford it. I will scrimp, if I must, somewhere else, not here. I will get up an hour earlier or work an hour later at night, if I must, so that George may have a good education.

Of course all farmers cannot be thoroughly educated men. In the present state of things few can aspire to that luxury.

So far as concerns the great mass of farmers' sons my work is mainly done in urging them up to a good elementary and English high school education. I should like to have George become a thoroughly educated man, farmer or no farmer, and if a good deal of exertion and sacrifice on my part will make that possible, he shall be. But most lives are subjected to limitations. If the way to that seems to be shut against him, he must make the most of the opportunities Providence gives him, and even so may enjoy a great many of the pleasures and gains which only the highly educated man enjoys in the fullest measure.

It is not necessary now to go on and discuss the question whether George shall go to college, because the principles already settled in my own mind will lead me to desire that he should go, if circumstances permit. I refuse to allow that the probability of his being a farmer will make any difference in the question. I can see no good reason why I should favor the boy who is going to be a lawyer or a physician, over his brother who is going to be a farmer, by sending the one to college and not the other. It would be just as unfair as to leave twice as much of my property to the one as the other. The farmer needs the education as much, and can make as good use of it, as the lawyer. I admit that the probability of his actually becoming a farmer grows less the more education you give him, and that simply because his education has given him the power to gain more of the desirable things of life with less work in some other way than by farming. But as the professions become more crowded, and competition grows fiercer, and as farming becomes less an operation of mere manual labor, and more one of skill and contrivance, more educated men will be attracted to agriculture, and education will become more and more the road to success and enjoyment in this as in all other pursuits.

My general principle is this, that before we come to the special education which shall fit one to become a farmer, a professional man, or whatever else, we will give him as extended and liberal an education as the circumstances will admit; the more, the better; the more thorough and scholarly, the better; the more varied, the better, provided each part be thorough; the more extended, the better, certainly up to the time of his majority, or even a year or two beyond. How much education it is in the power of a farmer to give to his boys, will depend on how high a value he sets on education, and how ambitious they are to get it. If from that small, stony New Hampshire farm, Ezekiel and Daniel Webster could find their way to college, the same faith and heroism in father and mother and boys, could make the way to college possible—it is not necessary that it be made easy—from almost any farm.

But has George done nothing but study all these years? Has his life been all books, books, study, study, and nothing else? Not so, if I am a wise father. The number of hours in a day, the number of days in a year, that can be profitably devoted to pure mental activity, without exhaustion to the mind and a strain upon the body, are fewer than we think them to be: sit down and calculate them, and see how large a margin we have left for other occupations. And besides, an important part of education has to do with matters that books and school teachers have no concern with, the training of eye, ear, hand, muscles; the development of the body to strength and agility; acquiring knowledge of common things, and getting, little by little, common sense; in short, that education by work, and experience, and responsibility, through which boys become vigorous, knowing, capable in practical affairs. Now in this part of education farmers have a great advantage over most others in the management of their boys. There is always something at hand for boys to do in the time not required for study. A farmer's boy learns to be industrious, handy, thrifty; he gets a vast amount of knowledge by dealing with stones, trees, horses, cattle, birds, bees, grasses, grains, fruits, wind, weather, country stores, peddlers; he has a thousand opportunities for getting varied knowledge which the village boy lacks. He has work entrusted to him, and gets independence and manliness through the sense of responsibility.

I am thoroughly convinced that every boy should be trained to some kind of industry—I do not mean a mere amateur, half-work, half-play kind of employment, but to some one of the great, necessary, bread-winning industries of mankind. Good health, good habits, right notions of life, can be secured to boys so effectually in no other way. The notion which village boys are getting, that going to school five hours a day, for five days in the week, for nine months in the year, exempts them from work for all the rest of the time, breeds habits of idleness and self-indulgence, which result in wasted and vicious lives. How to give to village boys the employment which they need, is a hard problem, which is now occupying the attention of thoughtful men. But fortunately for you, it is not your problem. The chances are all in your favor that your boy will learn industry, economy, the value of time, and most of the essential, if homely, virtues, through the experiences of life on the farm.

But sooner or later George must make his choice of a calling, and we will assume that he chooses to be a farmer. He has good reasons for his choice, and he chooses for those reasons, and not from necessity or whim. Because farming is an active, out-door, healthful employment; because it is an honorable and useful calling; because it insures a competency and holds out

the prospect of a moderate and comfortable degree of wealth ; and because it gives opportunity for the exercise of all the virtues, the cultivation of all the graces and the enjoyment of all the substantial comforts of life—he deliberately makes up his mind to be a farmer. He has already done much in the way of preparation for his life work. He has got considerable training of muscles, of sense, of mind. And now, just as a well-educated young man turns his attention to the law, or to medicine, or divinity, he applies himself to the study of agriculture. He is not intending to be a gentleman farmer, but is going into the business for the purpose of making a living. What, then, shall his special education for farming be ?

Agriculture though not a science, but an art, is surrounded by sciences which throw light upon it. And if we might call an art liberal in proportion to its affiliation to science, then agriculture is the most liberal of all the arts, for it is allied to more sciences than any other. Step out upon your land and pick up a handful of soil, and before you can answer all the questions which that soil puts to you, you must know something of Mineralogy, and Organic and Inorganic Chemistry. Stoop down and detach a single blade of grass with its roots, and you have in your hand all the essential data of the problem which that most interesting and wonderful science of Botany is called to solve. Crawling about under your feet, humming around your ears, infesting the plant you have in your hand, disputing with you the possession of the air you are about to take into your lungs, are living creatures whose structure, habits and relations to other organic life form the science of Entomology, which is only one department of the vast science of Zoology, which treats of all animate beings on the earth and in the air and in the sea. Every plant that grows on your farm, every animal in the stock-yard, every bird and insect that hovers in the air, every implement of husbandry, every road, fence, drain, farm-building, every running stream, swamp, muck-bed, forest, every change of temperature, rain storm, drought, every bare rock upheaved to the sun—everything, in short, that the farmer's eye rests upon or his ear hears as he looks and listens by day or by night, represents to him a science which lies very close to his work and which it is his interest to know. Indeed, it would be difficult to name a science in all the circle of them, which does not bear, immediately or remotely, on agriculture. George has learned something of these sciences in his general training, but he pursues them now not for the purposes of training but for knowledge. He has learned the fundamental principles of Chemistry, Botany and Physiology ; he should now pursue them into those details which touch the operations of farming. He studies Chemistry as related to soils and the food of plants ;

Botany as related to seeds, growth, propagation, hybridizing, grafting, irrigating, pruning; Physiology as related to the care and feeding of animals, breeding, fattening. His studies must now be real, connected with actual things, not mere pictures and illustrations of things.

But where shall George learn the *practical* part of farming? Certainly not from books or lectures or from any instructions of men themselves inexperienced, but on the farm, in the actual operations of bona fide farming. Experimental farming, amateur farming, fancy farming are all instructive, and I should wish to have George keep a shrewd eye on all innovations and be ready to learn the lesson which they have to teach. But the kind of farming from which a boy learns most is farming pursued as a business, and for the purpose of making a living. When George has finished his scientific studies, or while he is pursuing them if it can be arranged that he can study winters and work summers, I should like to put him to work on some well managed farm, where he will see and share in all the operations of a diversified agriculture. This is the practice pursued in some parts of the world where agriculture reaches its highest perfection, in the south of Scotland, for instance. There the lads who are going to be head farmers or stewards are first thoroughly educated in the schools and are then sent to spend a few years with a "scientific farmer," as he is there called; that is, a practical farmer who understands all branches of the business and has in operation on his farm, usually a large one, all the most approved methods. There he serves a sort of apprenticeship, giving his labor for the instruction he receives. Possibly some modification of this plan will be found to work with the farms attached to the agricultural colleges, so that they can be at once models for instruction and remunerative, or, at least, self-paying, as farms. But farming can be learned nowhere but on a farm. A learner must for a time be an apprentice, either to some one else or to himself. However wise he may be in the theory and principles of agriculture, he will be a bungler and a loser till he gain skill by experience.

I know too well what answer many will make to all this: "The education you describe is something very fine, but it would turn our children into gentlemen and ladies, whom we might have the privilege of waiting on. Education weans boys from the love of work, and our boys must work, as we did. Your scheme is not practical. It may do for the sons of a few rich farmers, but the majority of boys are better off with a good common education and plenty of work." Are the farmers of Vermont, then, a peasant class, to whom education is to be denied, and denied by themselves, lest it lift them out of the station in which it has pleased Providence to place them?

Is education something too good for them, something fit for their betters, but not for them? I have not read aright the history of Vermont if any such spirit as this is native to the soil. I believe that nothing God has to bestow on his most favored children is any too good for Vermonters, or for farmers? If education will make gentlemen and ladies of our children—and education and religion certainly will—there is no place where true gentlemen and ladies have a better right to live and reign and multiply their kind than on the farms and in the homes of Vermont. And if there is any good thing in life which we failed to get for ourselves because we came too early in the course of human progress, let us do all we can to secure it for our sons and daughters. There was one in history who thought it more glory to be a king-maker than a king. Let the farmer who is uneducated himself, and has felt his deficiencies, get his compensation in giving superior advantages to his children.

SHADE TREES ALONG THE HIGHWAYS.

The following law to encourage the planting of trees on the public roads has just been enacted:

SECTION 1. Every person planting, protecting and cultivating forest trees for three years, one quarter mile or more, along any public highway, shall be entitled to receive for ten years thereafter, an annual bounty of one dollar for each quarter mile, so planted and cultivated, to be paid out of the state treasury: but such bounty shall not be paid any longer than such line of trees is maintained.

SEC. 2. The forest trees named in Sec. 1st shall include the elm, maple, tulip, ash, basswood, oak, black walnut and hickory.

SEC. 3. Elms not to be more than sixty feet apart, and the others not more than thirty feet apart.

SEC. 4. This act shall take effect from its passage.

Nothing can add so much to the beauty and attractiveness of our country roads as long avenues of fine trees. One sees this illustrated in many countries in Europe, where for hundreds of miles on a stretch the road is lined with trees. With the liberal encouragement offered by this new law, no time should be lost in securing the same grand attraction to the highways of Connecticut. Growing on land otherwise running to waste, such trees would yield most satisfactory returns. The shade and beauty would be grateful to every traveler, but doubly so to the owner and planter, as the happy experience of hundreds of our farmers can now testify, for a ground work in this direction is already well started. Having in abundance the best trees for the roadside, no class can contribute so much to the adornment of our public roads as the farmers. In portions of Germany, the law formerly required every landholder to plant trees along his road frontage. Happy would it be for us if the sovereigns of our soil would each make such a law for himself.

CONSTITUTION OF A RURAL IMPROVEMENT ASSOCIATION.

As plans for Rural Improvement are often called for and as our farmers have been specially active in this good work, the following regulations and by-laws for such an association are here given. The conditions of membership may properly vary with the wealth and liberality of each community. Some associations fix the terms of membership at one, two, three and even five dollars *annually*, while others make them low enough to invite the coöperation of all classes.

1. This Association shall be called "THE RURAL IMPROVEMENT ASSOCIATION OF ———."

2. The object of this Association shall be to cultivate public spirit, promote good fellowship, quicken the intellectual life of the people, secure public health by better sanitary conditions in our homes and surroundings, improve our streets, roads, road-sides, side-walks, public pounds, protect natural scenery, remove nuisances, provide drinking troughs, break out paths through the snow, and in general to build up and beautify the whole town, and so enhance the value of its property and render it a still more inviting place of residence.

3. The officers of this Association shall consist of a President, a Vice-President, a Treasurer, a Secretary, and an Executive Committee of fifteen, six of whom shall be ladies.

4. It shall be the duty of the Executive Committee to make all contracts, employ all laborers, expend all money, and superintend all improvements made by the Association. They shall hold meetings monthly from April to October in each year, and as much oftener as they may deem expedient.

5. Every person who shall plant three trees by the road-side, under the direction of the Executive Committee, or pay three dollars in one year or one dollar annually, and obligate himself or herself to pay the same annually for three years, shall be a member of this Association.

6. The payment of ten dollars annually for three years, or of twenty-five dollars in one sum shall constitute one a life member of this Association.

7. Five members of the Executive Committee present at any meeting shall constitute a quorum.

8. No debt shall be contracted by the Executive Committee beyond the amount of available means within their control, and no member of the Association shall be liable for any debt of the Association, beyond the amount of his or her subscription.

9. The Executive Committee shall call an annual meeting, giving due notice of the same, for the election of officers of this Association, and at said meeting shall make a detailed report of all moneys received and expended during the year, the number of trees planted under their direction, and the number planted by individuals, length of sidewalks made or repaired, and the doings of the Committee in general.

10. This Constitution may be amended at any annual meeting by a two-thirds vote of the members present and voting.

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